

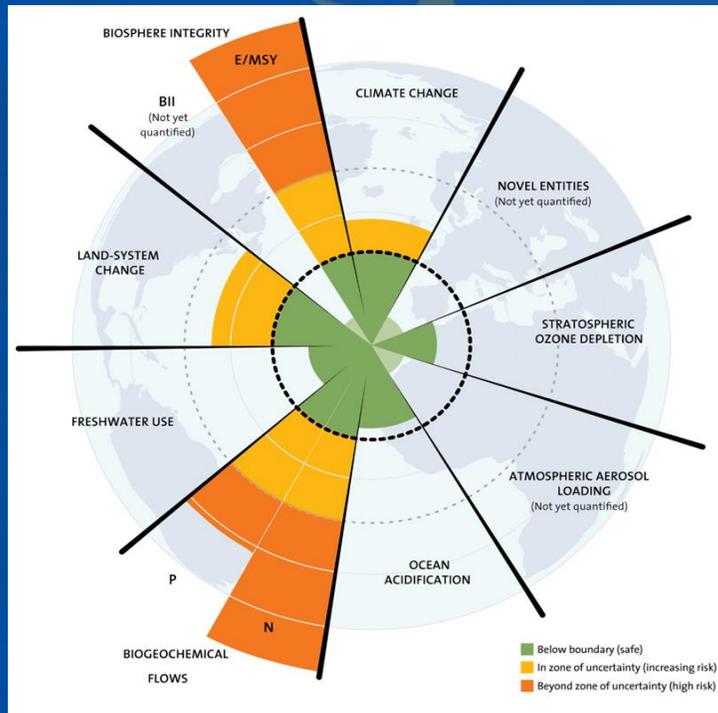


European
Commission

R&I activities on nitrogen and phosphorus in Horizon Europe

4th Phosphorus in Europe Research Meeting

2 June 2021



Katja Klasinc, RTD B1

H2020 projects on nutrient recovery

Recently closed projects Water	Ongoing Water	Ongoing Organic Waste	Ongoing – Fields related to nutrient
INCOVER SMART-PLANT POWERSTEP	REWAISE WATER-MINING WIDER-UPTAKE B-WATERSMART ULTIMATE RUN4LIFE NEXTGEN HYDROUSA WALNUT OPTAIN SABANA WATERAGRI ZERO-BRINE	<u>From organic waste</u> SYSTEMIC SCALIBUR RUSTICA SEA2LAND CIRC4LIFE LEX4BIO WATER2RETURN <u>From Animal Manure</u> FERTIMANURE NOMAD	<u>Nutrient efficiency:</u> CIRCULAR AGRONOMICS NUTRI2CYCLE GO-GRASS SolAce ECOBREED TomRes NUTRIMAN (CSA) <u>Health:</u> NUTRISHIELD <u>Blue Growth:</u> SEA2LAND; BlueBio;

This list is non-exhaustive

Nutrient recovery innovation presents strong links (synergies) with sectors such as Agronomics, Soil, Bio-economy, Health, Digital and the Blue economy.

Result Packs of interest - CORDIS



Soil health: Reaping the benefits of healthy soils, for food, people, nature and the climate

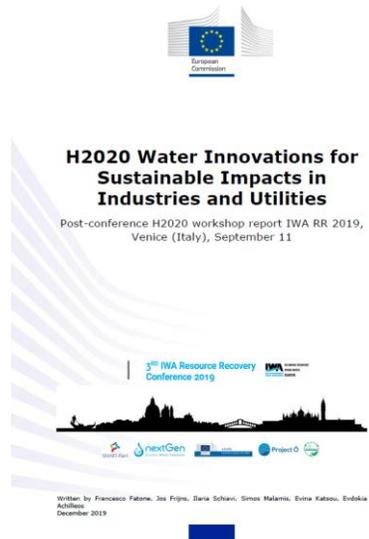


Water innovation: Technological solutions for ensuring Europe's present and future water security



Digitalization through the ICT4WATER cluster to boost innovation in the water sector

3rd IWARR (2019)– conclusions on nutrients



Check nutrient recovery key messages from this workshop on nutrient recovery

Link to the report:

<https://op.europa.eu/s/pcRa>

SWOT for Nutrient Recovery and Recycling

STRENGTHS

- Positive image for wastewater operators and local politicians.
- Availability of technologies and recycling routes.
- EU and national Circular Economy policies and political recognition of importance of nutrients (phosphorus on EU Critical Raw Materials List, nitrogen driven by Nitrates Directive and National Emissions Ceilings Directive)

OPPORTUNITIES

- Implementation of the current tested nutrient recovery technologies.
- New collaborations and networking knowledge.
- Implementation of new EU Fertilising Products Regulation and anticipated addition of STRUBIAS products
- Phosphorus recycling obligations in Germany (in place) and possibly in the future in other Member States.
- Possibility to make more coherent End-of-Waste status in different Member States (if action is engaged)

WEAKNESS

- Lack of coherent support by administration and incoherent legislation among countries.
- Widespread production of small quantities = need for new logistic and market models.
- Lack of operating data of larger-scale facilities, over time, in real wastewater industry conditions.

THREATS

- Public acceptance of recycled nutrient products

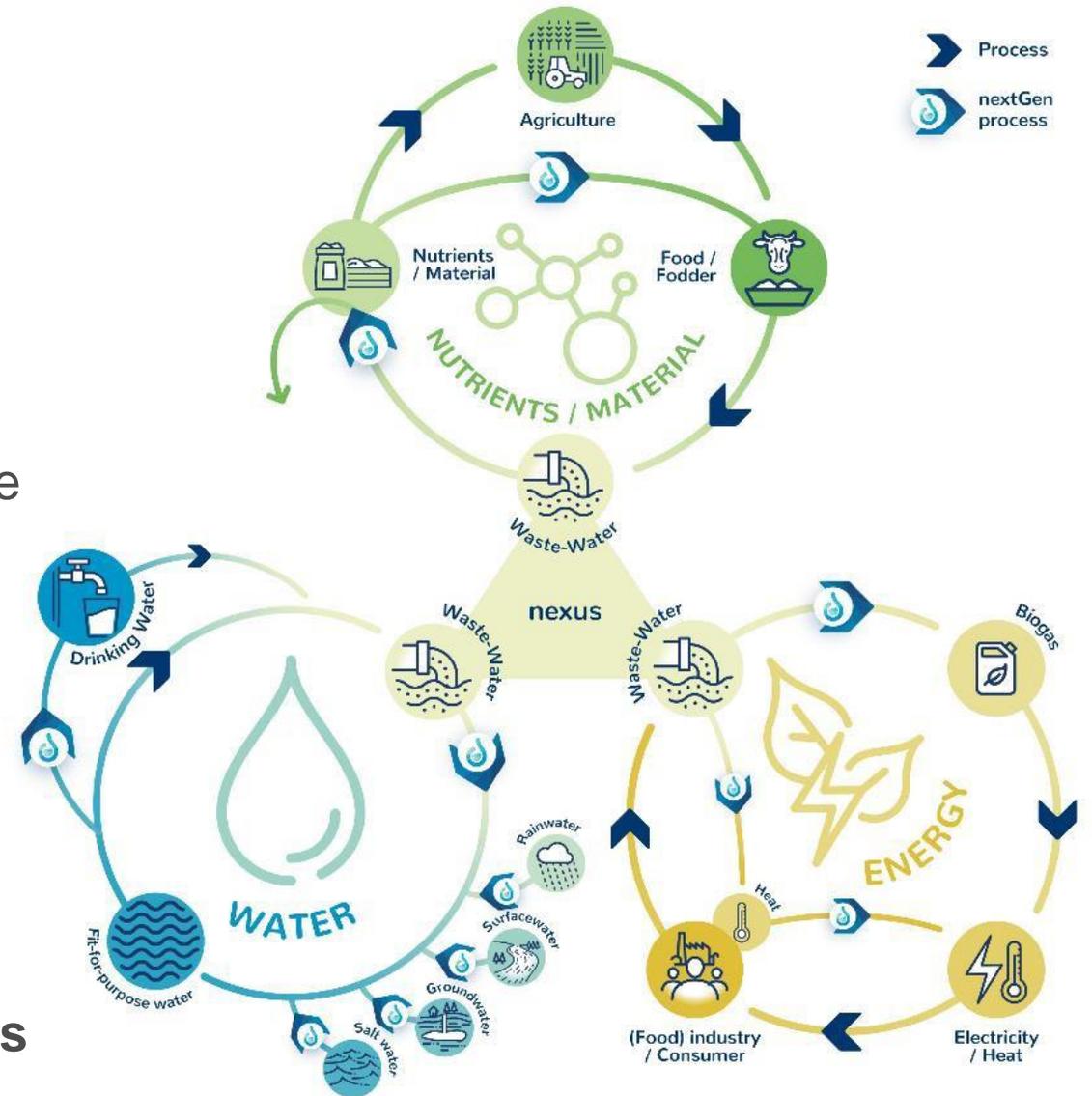
NEXTGEN

Coordinator: **KWR (NL)**
EU contribution: 9,97 m€
Budget: **11.38 m€**

10 large-scale demo-cases throughout Europe demonstrating nutrient recovery through:

- Ammonia stripping
- Struvite precipitation
- Sludge management
- Sludge pyrolysis
- C+N+P recovery
- P-K fertiliser production

- And many other nutrient recovery technics in **NEXUS** with Water and Energy cycles

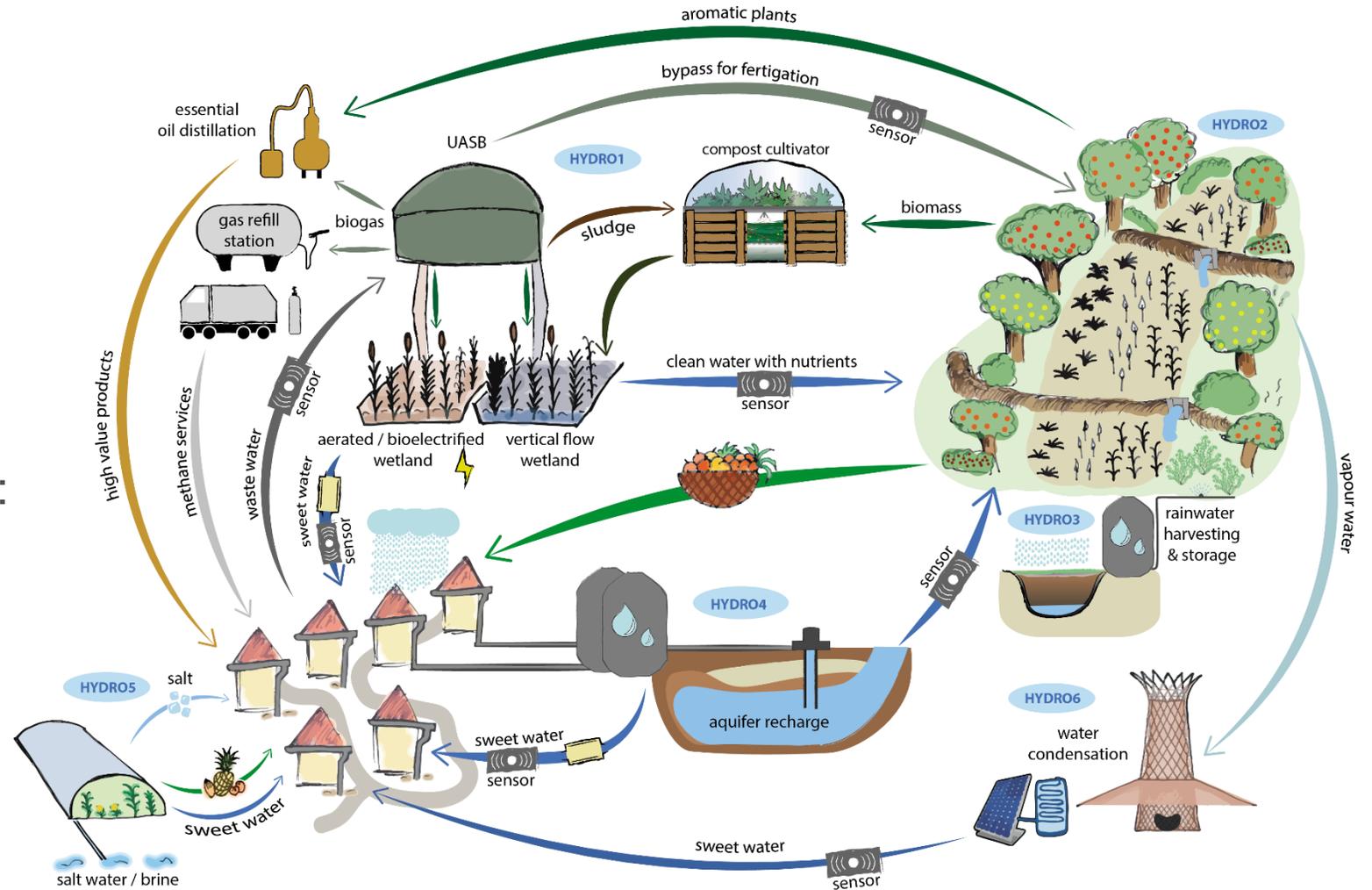


HYDROUSA

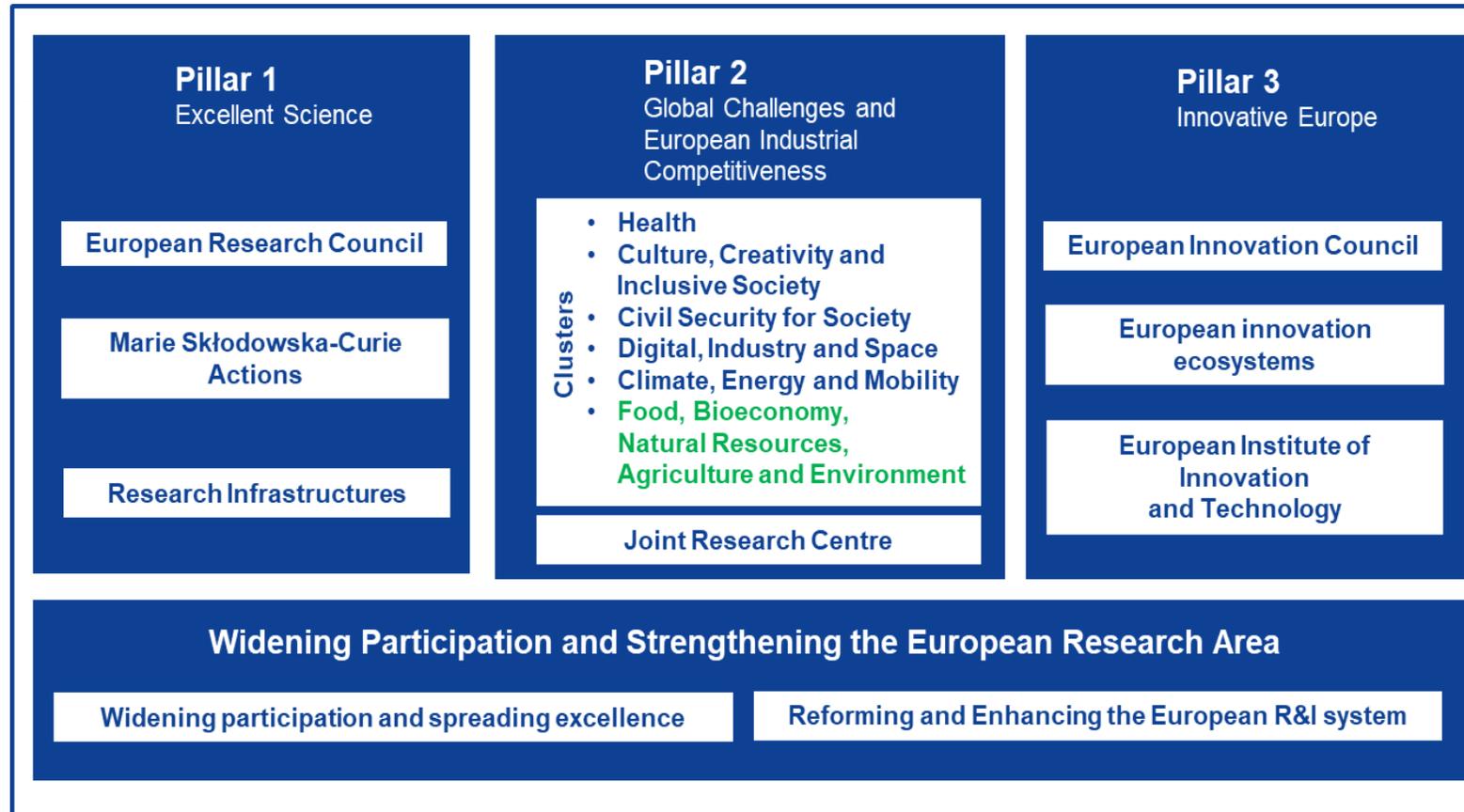
Coordinator: NTUA (EL)
 EU contribution: 9.96 m€
 Budget: 12 m€

6 demo-cases Europe
 and 25 replication sites including:

- Combining AD + Wetland and disinfection to treat WW and recover nutrients
- Agroforestry system with fertigation
- Reclaimed water for irrigation in ecotourism
- Also in NEXUS with Water and Energy cycles

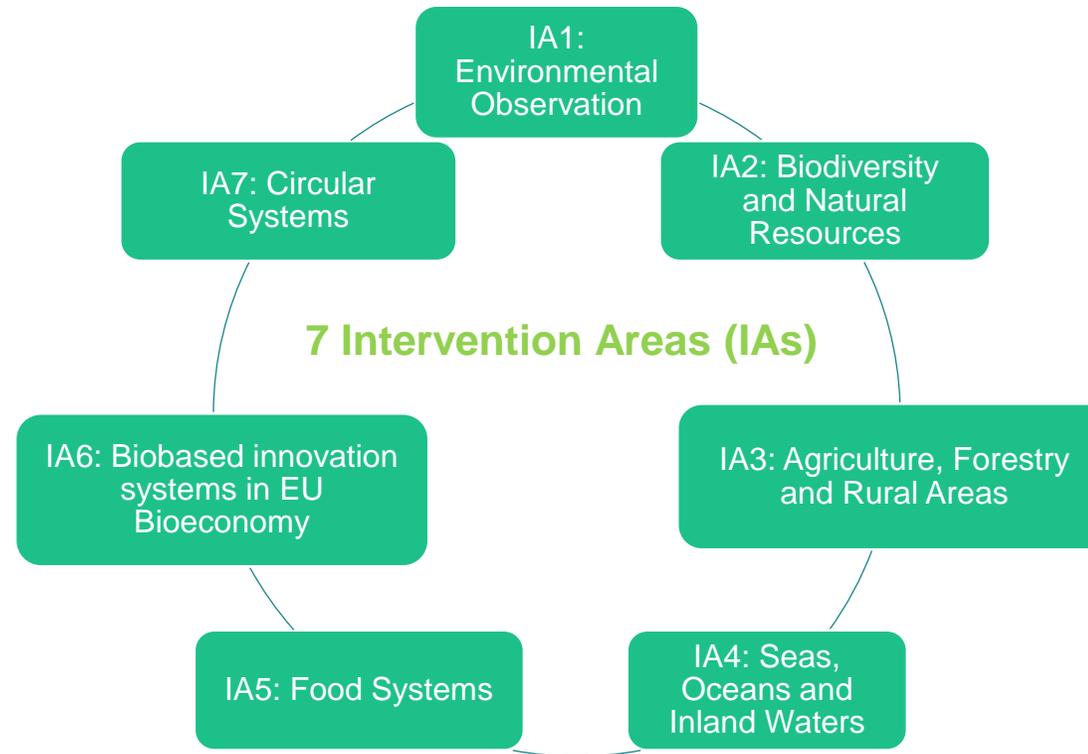


Horizon Europe 2021-2027



Cluster 6

“Food, Bioeconomy, Natural Resources, Agriculture and Environment”



Cluster 6 – Targeted Long-Term Impacts

Climate neutrality and adaptation to climate change

Governance models
enabling sustainability



Preservation and restoration
of biodiversity and ecosystems

Cross-
cutting
to Cluster 6
Intervention
Areas

Rural, coastal, peri-urban
and urban areas developed
in a sustainable, balanced
and inclusive manner



Sustainable and circular
management and use of natural
resources as well as prevention
and removal of pollution

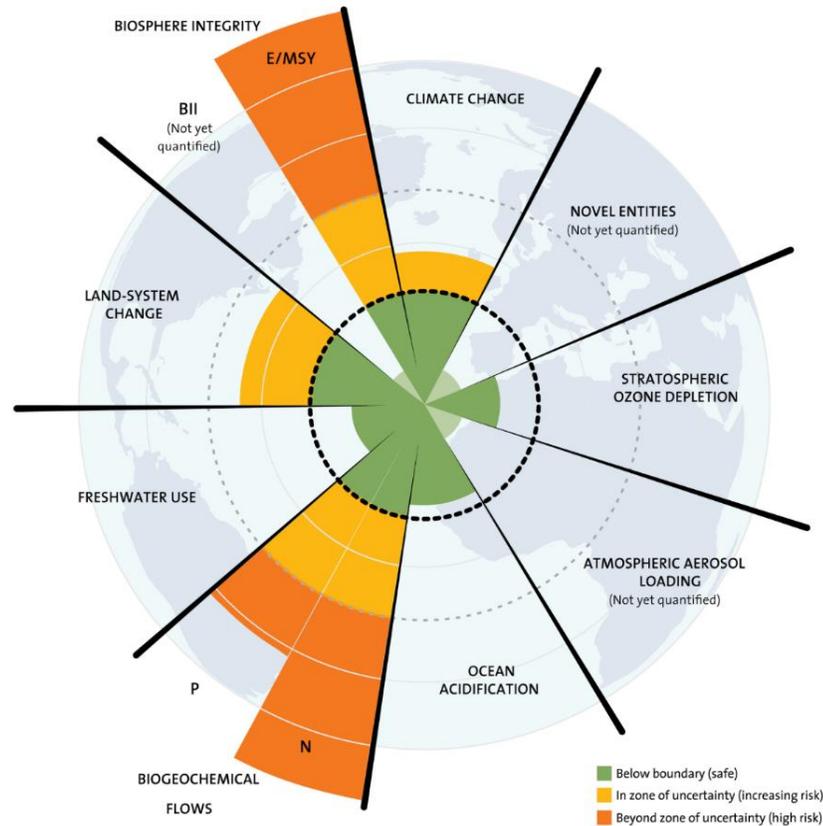


Food and nutrition security for all within planetary boundaries

Cluster 6 – Expected Impact

*“**Sustainable and circular management** and use of natural resources as well as prevention and removal of **pollution** are **mainstreamed**, unlocking the potential of the bioeconomy, ensuring competitiveness and **guaranteeing healthy soil, air, fresh and marine water for all**, through better understanding of planetary boundaries, deployment of innovative technologies and other solutions, notably in primary production, forestry and bio-based systems.”*

Keeping nitrogen and phosphorus flows within safe ecological boundaries



- Nitrogen (N) and phosphorus (P) flows exceed planetary boundaries
- EU exceeding safe boundaries by a factor of 3.3 for N; by a factor of 2.0 for P
- Environmental pollution on water, soil, air
- Biodiversity and ecosystems services loss
- Human health risks
- Overall costs of Nr €70–€320 billion per year, of which 75% related to air pollution effects and 60% to human health

R&I Gaps on N/P

- Basic research to fill **knowledge gaps of N/P thresholds** (flows/concentration) in air/water/soil to protect ecosystems, biodiversity
- **Modelling/assessing N/P emissions** from sources not included in reporting from Member States and in consolidated statistics (e.g. Eurostat)
- Stimulating the uptake of **technologies recovering N and P fertilisers** from waste streams/waste waters
- Assessing the **environmental impact** of recovered fertilisers, render techniques affordable, reliable and socially accepted
- Identifying **transition pathways** to apply place-based, integrated nutrient management solutions, incl. nutrient load targets and ecosystem-friendly practices, based on safe regional boundaries, involving all relevant governance levels/actors

Planned Activities on N/P in Horizon Europe

- **Regional N/P load targets approach**
- **Optimising nutrient budgets in agriculture**
- **Assessing environmental impacts of alternative fertilising products**
- **Innovative governance solutions to limit nitrogen and phosphorus emissions in different environments**

European Green Deal

R&I on nitrogen and phosphorus will contribute to

- Zero Pollution Ambition
- Farm to Fork Strategy
- Biodiversity Strategy
- Circular Economy Action Plan



THANK YOU